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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/805,594

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EXAMINER

SUTHERS, DOUGLAS JOHN

ART UNIT

PAPER NUMBER

2615

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/805,594	<b>Applicant(s)</b> KOST ET AL.	
	<b>Examiner</b> DOUGLAS SUTHERS	<b>Art Unit</b> 2615	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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## DETAILED ACTION

1. The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit 2615.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3, 5, 8-11, 14, 16, and 20-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Oki et al. (US 2001/0010482 A1).

4. Regarding claim 1, Oki discloses a system comprising:

a digital amplifier controller (figure 1, items 11, 12, 21, 22, and microcomputer);  
an amplifier output stage coupled to the controller and configured to receive  
audio signals from the controller (Tr11, Tr12, Tr21, Tr22);  
one or more sensors coupled to the output stage (figure 9, Comp1); and

one or more low-pass filters coupled to the one or more sensors and configured to receive sensor signals from the one or more sensors (44 and Comp2);

wherein the low-pass filters are configured to filter the sensor signals and to provide the filtered sensor signals to the controller (NG trigger is filtered signal); and

wherein the controller is configured to provide a programmable response based on the filtered sensor signals (responds via Sng and Scl signal).

5. Regarding claim 3, Oki discloses wherein the controller comprises a pulse width modulation (PWM) controller (figure 1, item 3) and the output stage comprises a PWM output stage (Tr11, Tr12, Tr21, Tr22);

6. Regarding claim 5, Oki discloses further comprising one or more comparators (Comp1), wherein each comparator is coupled to receive an analog sensor signal (voltages) from a corresponding one of the sensors and to generate a binary sensor signal (H:NG) which is provided to a corresponding one of the low-pass filters.

7. Regarding claim 8, Oki discloses wherein the low-pass filters comprise accumulators (44).

8. Regarding claim 9, Oki discloses wherein the filtered sensor signal corresponding to each accumulator is not asserted when a value in the accumulator is

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below a threshold (n/m) and is asserted when the value in the accumulator is above the threshold (via Comp2).

9. Regarding claim 10, Oki discloses wherein the threshold is programmable (n/m).

10. Regarding claim 11, Oki discloses wherein the controller is configured to receive filtered sensor signals from multiple sensors and to provide responses bases on each of the filtered sensor signals (found in each of items 11, 12, 21, and 22).

11. Regarding claim 14, Oki discloses a method comprising:

sensing a condition of an audio amplifier output stage (figure 1, voltages across Tr11, Tr12, Tr21, and Tr22);

providing a sensor output signal corresponding to the sensed condition (figure 9, signal H:NG);

low-pass filtering the sensor output signal to produce a filtered sensor signal (NG trigger is filtered signal);

providing the filtered sensor signal to an audio amplifier controller (items 31, A11, and microcomputer) and

providing a programmable response based on the filtered sensor signal (responds via Sng and Scl signal).

12. Regarding claim 16, Oki discloses further comprising detecting a shoot-through condition in the output stage (excessive voltage).

13. Regarding claim 20, Oki discloses wherein providing a sensor output signal corresponding to the sensed condition comprises sensing a voltage corresponding to the sensed condition (voltage between source and drain), comparing the voltage to a reference value and generating a binary signal based upon the comparison (Comp1, paragraph [0046]).

14. Regarding claim 21, Oki discloses wherein low-pass filtering the sensor output signal comprises incrementing and/or decrementing an accumulator (44) based upon the binary signal and generating a signal indicative of whether a value in the accumulator is above or below a threshold value (NG Trigger) associated with the accumulator.

15. Regarding claim 22, Oki discloses further comprising modifying the threshold value associated with the accumulator (paragraph [0074]).

16. Regarding claim 23, Oki discloses further comprising processing filtered sensor signals corresponding to multiple sensors through common logic in the controller (through the microcomputer).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 6, 7, 12, 13, 15, 18, 19, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oki et al. (US 2001/0010482 A1).

17. Regarding claim 2, Oki discloses wherein the controller comprises a pulse width modulation (PWM) controller (figure 1, item 3) and the output stage comprises a PWM output stage (Tr11, Tr12, Tr21, and Tr22);

wherein the system further comprises one or more comparators (Comp1) coupled to receive analog sensor signals (voltages) from corresponding ones of the sensors and configured to generate binary sensor signal (H:NG) which are provided to corresponding ones of the low-pass filters;

wherein each low-pass filter comprises an accumulator (44) configured to not assert the filtered sensor signal when a value in the accumulator is below a programmable threshold (n/m) and to assert the filtered sensor signal when the value in the accumulator is above the threshold (via Comp2);



wherein the controller is configured to detect over-current and over-temperature conditions in the output stage (excessive voltage across source and drain means excessive current and heat); and

wherein the programmable response to the filtered sensor signals is selected from the group of responses consisting of: shutting down the output stage (shut down via A11); and compressing at least a portion of the audio signals.

Although Oki does not expressly disclose the use of current or heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein the one or more sensors comprise at least one current sensor and at least one temperature sensor.

18. Regarding claims 6 and 7, although Oki does not expressly disclose the use of current or heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein the one or more sensors comprise at least one current sensor or at least one temperature sensor.

19. Regarding claim 12, Oki discloses wherein the controller is configured to detect over-current and over-temperature conditions in the output stage (excessive voltage).

Although Oki does not expressly disclose the use of current or heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein the one or more sensors comprise at least one current sensor and at least one temperature sensor.

20. Regarding claim 13, Oki discloses wherein the programmable response based on the filtered sensor signals comprises compressing at least a portion of the audio signals (output compressed as shown in Figure 3, out1).

21. Regarding claim 15, Oki discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (figure 1, item 3).

Although Oki does not expressly disclose the use of current sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing

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the condition of the output stage comprises detecting a current through a transistor of the output stage.

22. Regarding claim 18, Oki discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (Tr11, Tr12, Tr21, Tr22).

Although Oki does not expressly disclose the use of heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing the condition of the output stage comprises detecting a temperature of a transistor of the output stage.

23. Regarding claim 19, Oki discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (Tr11, Tr12, Tr21, Tr22).

Although Oki does not expressly disclose the use of heat sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing the condition of the output stage comprises detecting a temperature of a heat sink of the output stage.

24. Regarding claim 24, Oki discloses wherein providing the programmable response based on the filtered sensor signal comprises compressing at least a portion of the audio signals (output compressed as shown in Figure 3, out1).

25. Claims 4 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oki et al. (US 2001/0010482 A1) in view of Bridge (US 6396250 B1).

26. Regarding claim 4, Oki discloses wherein the controller is configured to detect shoot-through current (via excessive voltage).

Although Oki does not expressly disclose the use of current sensors, it would have been obvious to use such in place or in conjunction with the voltage sensors. The motivation to use such would have been as given by Oki (paragraph [0012]) to avoid thermal damage due to excessive current. Therefore at the time of invention, it would have been obvious to one of ordinary skill in the art to further comprise wherein sensing the condition of the output stage comprises detecting a current through a transistor of the output stage.

Oki does not expressly disclose adjusting delays.

Bridge discloses a PWM output stage comprising a controller configured to responsively adjust delays (figure 7, items 720 and 722) between a high-side signal and

a low-side signal (delays driving drivers until system is ok) to minimize the shoot-through current.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the delay control of Bridge in the system of Oki. The motivation for doing so would have been to distribute the maximum power via maximum transistor on time, while insuring no shoot-through current. Therefore, it would have been obvious to combine Bridge with Oki to obtain the invention as specified in claim 17.

27. Regarding claim 17, Oki does not expressly disclose adjusting delays.

Bridge discloses a PWM output stage comprising adjusting relative delays (figure 7, items 720 and 722) between a high-side signal and a low-side signal input to the output stage to minimize shoot-through.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the delay control of Bridge in the system of Oki. The motivation for doing so would have been to distribute the maximum power via maximum transistor on time, while insuring no shoot-through current. Therefore, it would have been obvious to combine Bridge with Oki to obtain the invention as specified in claim 17.

### ***Response to Arguments***

28. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

29. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DOUGLAS SUTHERS whose telephone number is (571)272-0563. The examiner can normally be reached on 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571)272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Douglas Suthers/  
Examiner, Art Unit 2615

/Vivian Chin/  
Supervisory Patent Examiner, Art Unit 2615